

ENVIRONMENTAL ASSESSMENT for
the TRANSLOCATION of DESERT BIGHORN SHEEP
from MOJAVE NATIONAL PRESERVE to the
NAVAL AIR WEAPONS STATION, CHINA LAKE,
CALIFORNIA

Mojave National Preserve
2701 Barstow Road
Barstow, CA 92311

TABLE OF CONTENTS

SECTION I: PURPOSE OF AND NEED FOR ACTION	4
Introduction	4
Purpose and Need	8
Background	8
Related Laws, Policies, and Other Planning Documents	13
Environmental Assessment	15
Issues and Impact Topics	15
Issues and Impact Topics Identified for Further Analysis	15
Impact Topics Considered but Dismissed from Further Consideration	15
SECTION II: DESCRIPTION OF ALTERNATIVES	17
Introduction	17
Alternative A (No Action)	17
Alternative B (Translocate Desert Bighorn Ewes from Mojave National Preserve to the Naval Air Weapons Station at China Lake)	17
Alternative C (Translocate Desert Bighorn Ewes from Another Source Population to the Naval Air Weapons Station at China Lake)	19
Alternatives Considered but Eliminated from Further Evaluation	19
Consultation, Coordination, and Permit Requirements	19
Environmentally Preferred Alternative	20
SECTION III: AFFECTED ENVIRONMENT	21
Introduction	21
Location and General Description of Mojave National Preserve	21
Natural Resources	21
Cultural Resources.....	23
Socioeconomic Resources, Visitor Use, and Park Operations	23
Wilderness	24
SECTION IV: ENVIRONMENTAL CONSEQUENCES	25
Introduction	25
Methodology	25
Criteria and Thresholds for Impact Analyses	25
Criteria and Thresholds for Impact Analyses of All Other Issues	26
Impairment Analysis	26
Impacts to Wildlife, Wildlife Habitat, Sensitive Species	27
Impacts to Natural Soundscapes	29
Impacts to Visual Resources	30
Impacts to Visitor Experience	30
Impacts to Safety	31
Impacts to Cultural Resources	31
Impacts to Wilderness	32
Cumulative Impacts	35
Impairment	35
Environmentally Preferred Alternative	35
SECTION V: COORDINATION AND CONSULTATION	37
SECTION VI: LIST OF PREPARERS	37
SECTION VII: REFERENCES	38
LIST OF FIGURES	
Figure 1. Regional Map	5
Figure 2. Mojave National Preserve Map	6
Figure 3. China Lake Eagle Crags Mountains Map	7
Figure 4. Census Data from Helicopter Surveys of Desert Bighorn Sheep in the Old Dad/Kelso Peak Area (California Department of Fish and Game) ..	11

LIST OF TABLES

Table 1. Translocation of Desert Bighorn Sheep to Eagle Crags, Naval Air Weapons Station at China Lake, California	9
Table 2. Big Game Guzzlers in the Old Dad Mountain and Kelso Peak, Mojave National Preserve	10
Table 3. Cumulative Impacts of All Alternatives	29

APPENDICES

Appendix A. Wilderness Minimum Requirement Analysis	33
Appendix B. Wilderness Minimum Tool	38

SECTION I: PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

California Department of Fish and Game (CDFG), in cooperation with the National Park Service (NPS), is considering bighorn sheep (*Ovis canadensis nelsoni*) management activities within the Old Dad Mountain of Mojave National Preserve (Mojave) and on non-contiguous lands administered by the Department of the Navy on the Naval Air Weapons Station at China Lake. The area within Mojave National Preserve that could potentially be affected by the action is located in designated Wilderness.

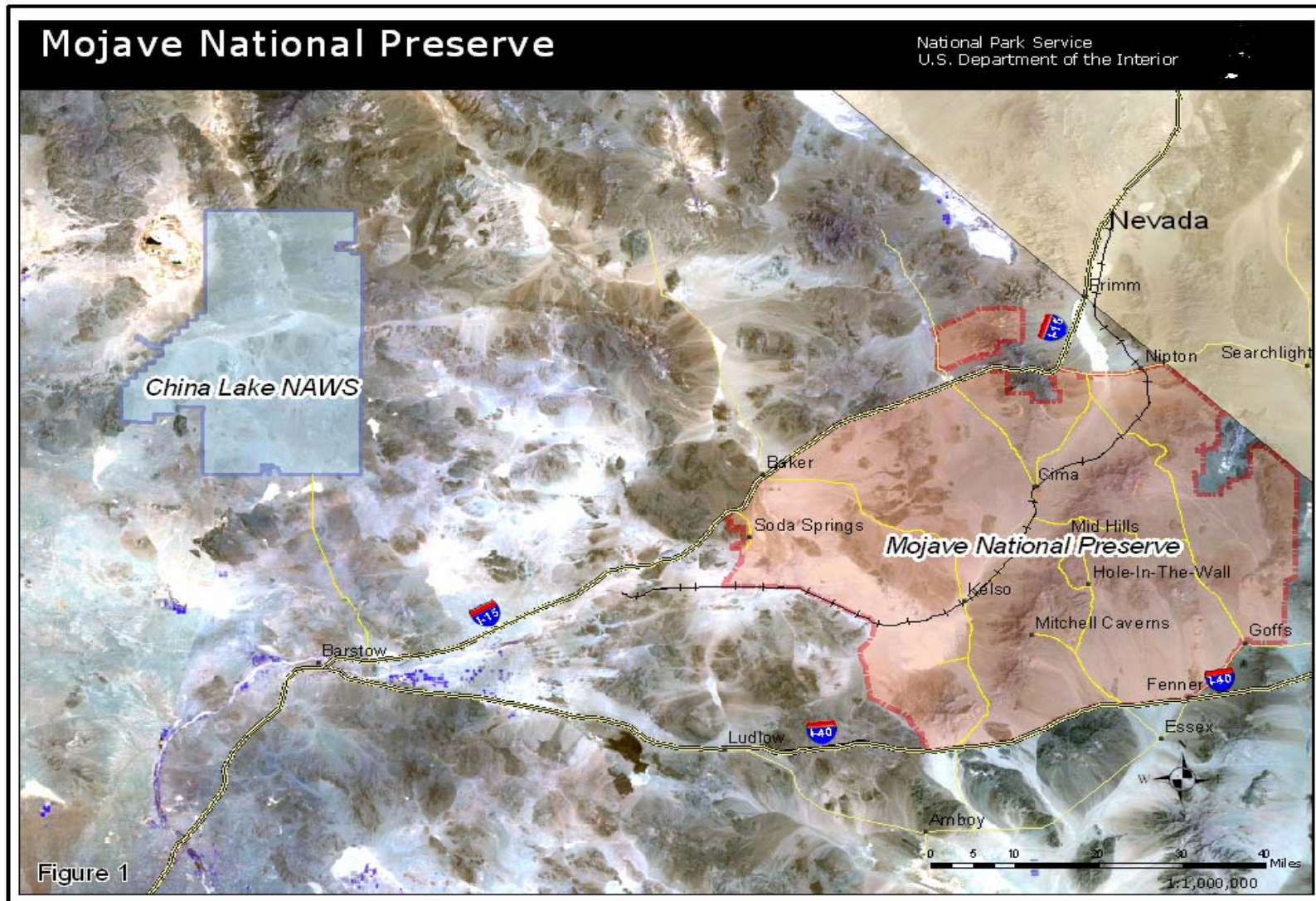
Mojave National Preserve is situated in southeastern California between Interstate Highways 15 and 40 (Figures 1 and 2). Bighorn sheep are prominent on Old Dad Mountain but are also fairly numerous on Clark Mountain, Kelso Peak, and Piute Peak. CDFG and its volunteers (e.g., Society for the Conservation of Bighorn Sheep) maintain and monitor six big game guzzlers at these locations. CDFG also conducts aerial surveys of the bighorn population in Mojave and monitors a sample of the herd with radio telemetry collars.

Within Mojave National Preserve bighorn sheep also occur in the Providence Mountains, Woods Mountains, and Hackberry Mountains. These populations have not been surveyed on a regular basis but are believed to be substantially smaller in size than the Old Dad population. The impacts from the recent Hackberry Complex fires (June 2005) on the Hackberry population have not been fully assessed.

CDFG has proposed to translocate up to 15 desert bighorn ewes from Old Dad Mountain to Eagle Crags at China Lake. Depending on capture success and availability of radio telemetry collars, the actual number of ewes will fall between five and 15. Due to the high costs of helicopter time and radio telemetry collars, translocating as many as 15 ewes may be prohibitively expensive.

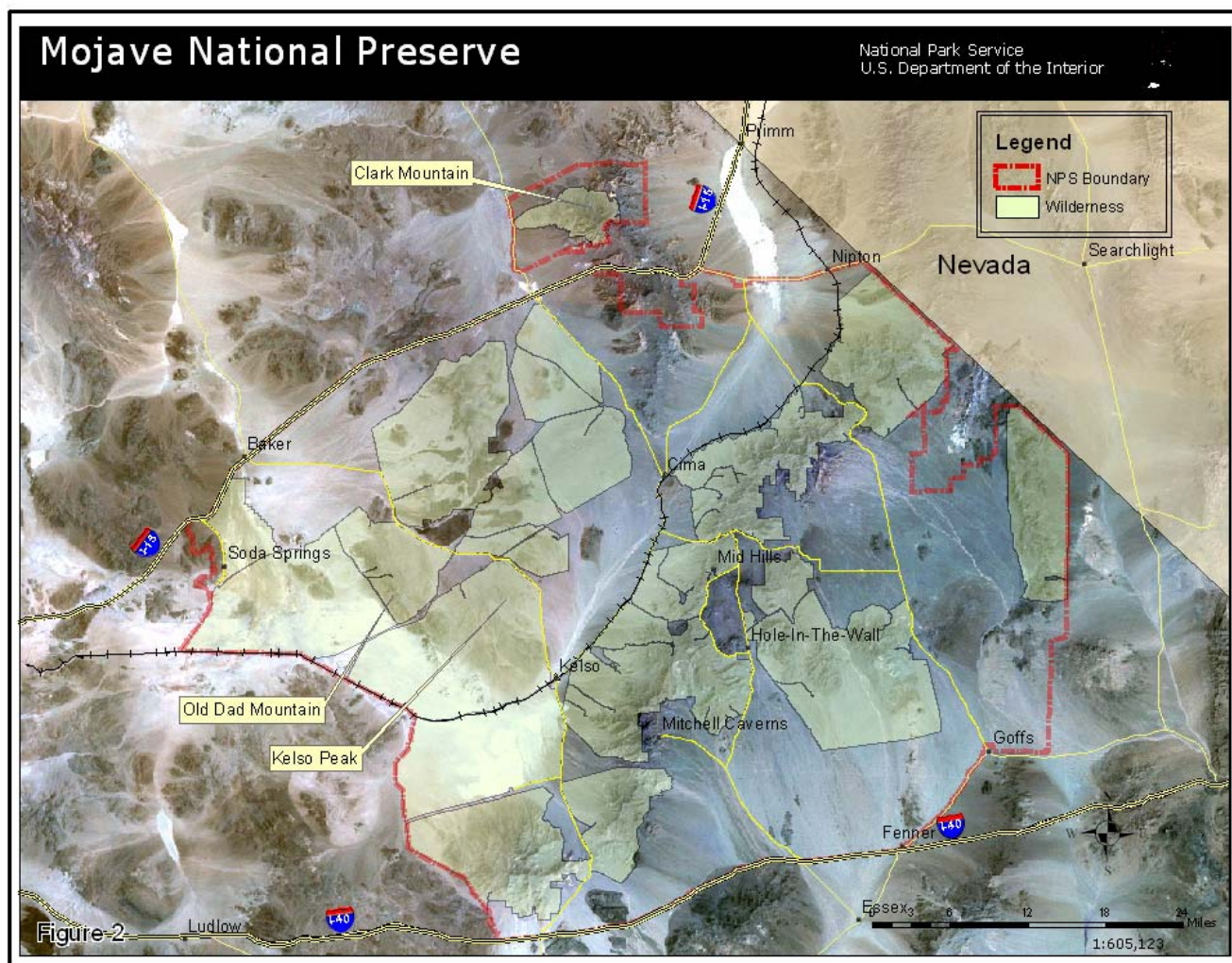
Sheep will be captured by net-gunning from helicopters, then transported to a base camp three kilometers southwest of Kelbaker Road (SW1/4 Sec. 10, T12N, R11E) and processed. The animals will be transported by truck to the Eagle Crags. All animals captured but not transported will be released in the area of their original point of capture.

Figure 1: Regional Map of southeastern California showing both Mojave National Preserve and NAWS China Lake



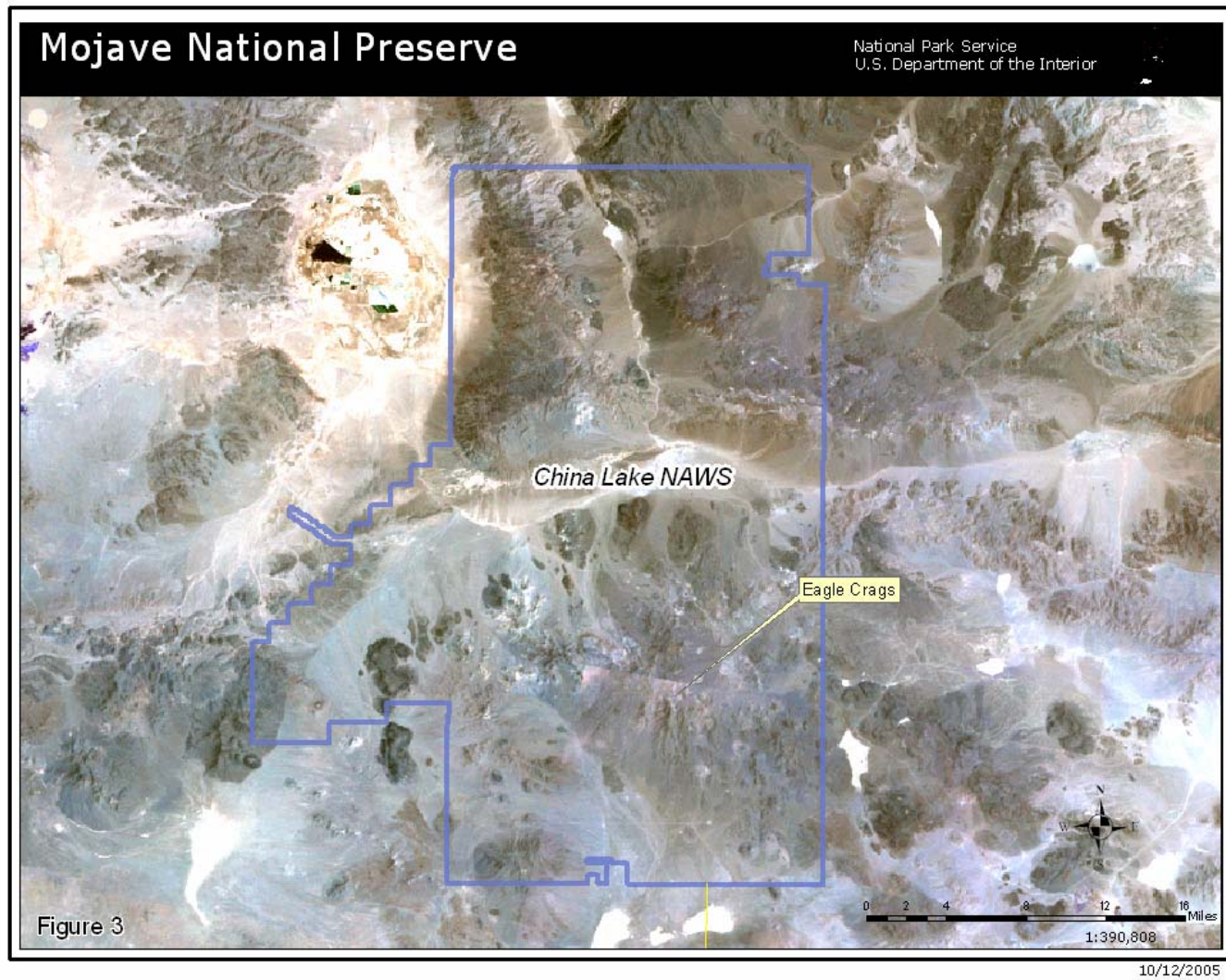
10/12/2005

Figure 2: Mojave National Preserve Map (with wilderness boundaries)



10/12/2005

Figure 3: China Lake Eagle Crag Mountains Map



PURPOSE AND NEED

The purpose of CDFG's proposal is to capture and relocate five to 15 radio-collared, female desert bighorn sheep to the Naval Air Weapons Station (NAWS) at China Lake, California.

Desert bighorn sheep were reintroduced into the Eagle Crag Mountains on the NAWS South Range in 1983 and 1985. Although the majority of these reintroduced animals remained in the Eagle Crag, a number of sheep were lost to emigration, predation, and accidents. During the 1990's census flights continued to document a stable herd of 20 to 25 individuals. Animals appeared healthy and the herd appeared to comprise a normal array of older and younger, male and female animals. Aerial census data collected in 2003 revealed the presence of 17 rams and two ewes. Limited surveys of some nearby mountain ranges did not locate a separate population composed primarily of female sheep.

The CDFG has identified a need to augment the existing population to correct the skewed sex ratio and increase the reproductive potential of this herd. CDFG has also identified a need to routinely monitor the newly released animals to determine daily and seasonal movements. If the newly released radio-collared sheep also establish themselves in another nearby area the radio collars will allow personnel to monitor their location, distribution, and interaction with the male dominated group remaining in the Eagle Crag.

BACKGROUND

History of Bighorn Sheep in California

Mountain bighorn sheep are native to the State and have traditionally inhabited the Sierra Nevada mountains and California deserts. Populations throughout North America declined concurrently with the European colonization of the American Southwest starting in the 1500's. As many as 80 groups of desert bighorn once thrived in the state but 30 are now extinct. They have been protected in California since 1878 when the State of California passed temporary legislation to protect all bighorn sheep from hunting. In 1883, this protection was made permanent. Despite this action, numbers continued to decline. The State of California began to transplant bighorn in 1971.

Two populations of the species, *Ovis Canadensis* - those in the Sierra Nevada and in the Peninsular range of California - have endangered status under the Endangered Species Act. In addition, *Ovis c. californiana* (Sierra Nevada) has been classified as endangered under the California Endangered Species Act. This desert subspecies, *O. c. nelsoni*, is not federally or state listed and has been legally hunted since 1986. The State of California designated desert bighorn a "sensitive" species in 1980. This designation increased management attention to the species and its habitat. The State of California lists Nelson desert bighorn as "fully protected" because of habitat fragmentation.

CDFG has attempted to restore 13 populations of mountain sheep to their historic ranges since 1970. Two have failed completely. As of 1989, four herds of mountain sheep were reestablished within the Mojave Desert. At the time, the lands now within Mojave National Preserve were managed as the East Mojave National Scenic Area by the Bureau of Land Management (BLM). CDFG has not defined criteria for successful bighorn sheep restoration.

CDFG has defined as its management goal for the Old Dad/Kelso Peak herd to maintain a large, viable, and stable herd within the unit. The objectives to achieve this goal are:

- a. Increase population productivity and habitat carrying capacity by

- enhancing habitat components.
- b. Promote the expansion of mountain sheep distribution in other management units by utilizing the population in [the Old Dad] Management Unit in a sound and effective relocation program.
- c. Provide for sport hunting of mountain sheep rams while meeting other objectives.
- d. Promote public support for mountain sheep management.
- e. Determine management plan effectiveness and make herd management decisions through monitoring of populations and use of artificial waters. (US Bureau of Land Management and California Department of Fish and Game, Old Dad Peak Mountain Sheep Habitat Management Plan, 1989)

The Old Dad and Kelso Peaks bighorn sheep range is estimated to be 66.36 square miles. Few historical records of bighorn population estimates are available or reliable. For the Old Dad Management Unit, estimates from 1940 through 1987 ranged from five to 250. These estimates were developed through aerial survey, time-lapse photography, pellet transects, and anecdotal information. From 1981 through 1988, aerial surveys with age structures indicated a population increase from 53 (31 ewes) to 152 (58 ewes) in total.

Since 1983 more than 200 individuals have been captured from this population for translocation to other Mojave Desert mountain ranges; no removals have occurred since 1992. This environmental assessment does not contain a complete set of sheep numbers, translocation dates, or the final destinations of all of the animals removed from the Old Dad population in past translocation projects.

CDFG claims a need to remove sheep from the Old Dad Mountains and Kelso Peak since 1983 to prevent the Old Dad population from exceeding carrying capacity and to repopulate historic ranges where bighorn had been previously extirpated. Between 1984 and 1987, 131 bighorn were captured from the Old Dad population and translocated to the Whipple Mountains, Sheep Hole Mountains, Argus Range and Eagle Crags. Desert bighorn sheep in the Old Dad and Kelso mountains have been monitored with radio telemetry collars since 1988. As shown in Table 1, translocations of bighorn sheep to Eagle Crags deriving from the Marble Mountains and Old Dad Mountain were completed in 1983 and 1987. Sheep were translocated from the Old Dad, Kelso, and Marl Mountains twice more - 35 ewes in 1989 and 31 in 1992. All of these data were collected and provided by CDFG.

TABLE 1: TRANSLOCATION OF DESERT BIGHORN SHEEP TO EAGLE CRAGS, NAVAL AIR WEAPONS STATION AT CHINA LAKE, CALIFORNIA

YEAR	SOURCE POPULATION	TRANSLOCATIONS TO EAGLE CRAGS
1983	Old Dad Mountain	17 sheep: five adult females, five adult males, four lamb females, three lamb males
1983	Marble Mountains	8 sheep: seven adult females, two adult males, one yearling female
1987	Old Dad Mountain	16 sheep: nine adult females, five adult males, one lamb female, one lamb male

Bighorn Sheep Management within Mojave National Preserve

Mojave National Preserve is home to native populations of Nelson's bighorn sheep (*Ovis canadensis nelsonii*). For a variety of reasons there have been conflicting estimates regarding the size of these populations. For instance, population estimates as of 1994 when Mojave was established were estimated by S. Torres et al (1994) as ranging from 400 to 675 or more animals. In contrast, the 1994 helicopter census of the Old Dad Peak area estimated a

population of 134 and only 10 sheep were observed in the Clark Mountain area. These two areas have the best known and largest bighorn sheep populations on the Preserve, which suggests that the actual number could have been much less than estimated by Torres et al. (1994). Indeed, no estimate was made due to the low numbers observed in the Clark Mountain area (unpublished data, California Department of Fish and Game Helicopter Flight Survey, 1994).

Mojave National Preserve is one of the few places in California where bighorn sheep hunting is permitted. The State authorized mountain sheep hunting in the Old Dad Peak and Kelso Mountains areas in 1986 when they were under the jurisdiction of the Bureau of Land Management. California Department of Fish and Game issues sport hunting permits for up to 15% of the mature males within the Old Dad Peak Management Unit per year. Permits are issued through a lottery system; in addition, one permit is auctioned to the highest bidder.

Based on CDFG recommendations in 1969, big game guzzlers were installed in the East Mojave National Scenic Area (Bureau of Land Management) in the 1970s and 1980s.

TABLE 2: BIG GAME GUZZLERS IN THE OLD DAD MOUNTAIN AND KELSO PEAK, MOJAVE NATIONAL PRESERVE

Big Game Guzzler	Number	Location	Year Installed
Old Dad Peak	SB-10	Old Dad Peak	1975
Kelso Peak	SB-13	Kelso Peak	1977
Old Dad Peak North	SB-15	Old Dad Peak	1981
Chuck Kerr	SB-23	Old Dad Peak	1985

Big game guzzlers were also installed on Clark Mountain and Piute Peak sometime in the 1970s or 1980s. These two guzzlers are within Mojave National Preserve but outside of the CDFG Old Dad Peak Management Unit.

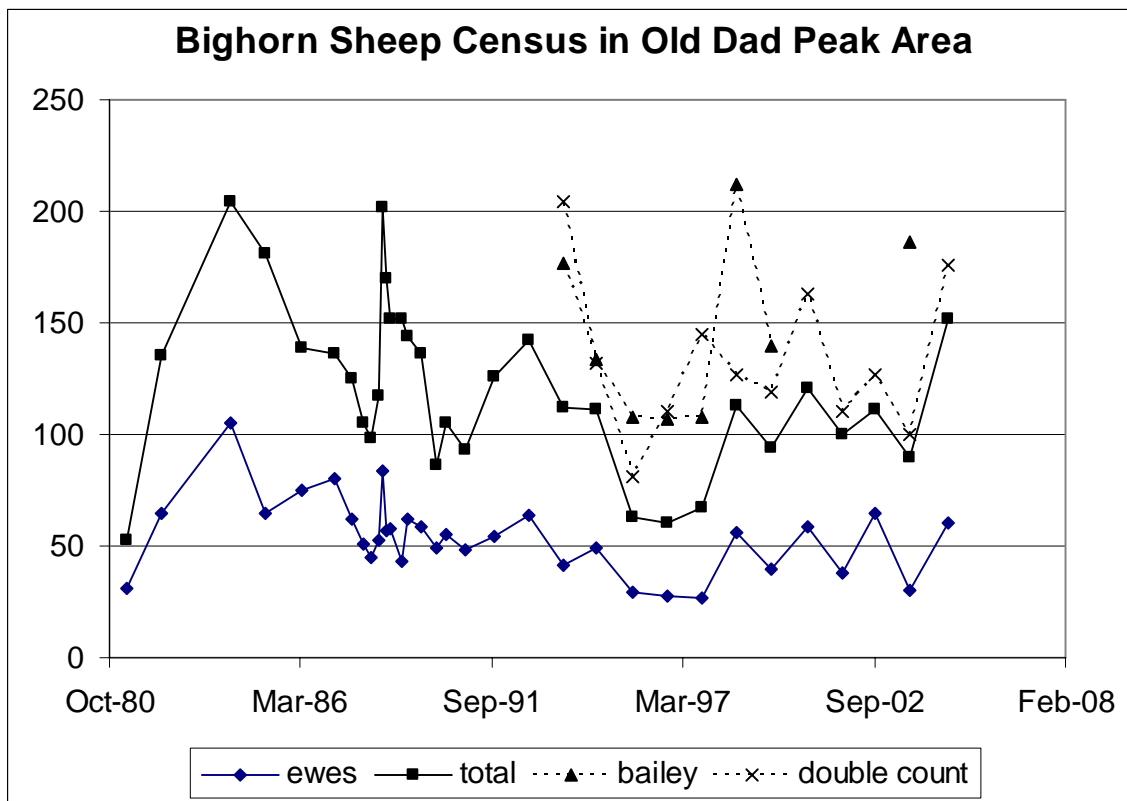
In 1989, CDFG recorded sheep occupation of Marl Springs, Jackass Spring, Old Dad Seep, and Old Dad Spring. Marl Springs was the only known perennial water source. Jackass Spring was observed to have surface water in most years. Old Dad Spring and Old Dad Seep were dug out to increase water availability to the sheep but were observed to fill in rapidly with silt. Neither source is perennial. NPS personnel have also observed bighorn use of Cornfield Spring and springs in the Hackberry Mountains.

In CDFG's 1987 Mountain Sheep Management Plan: Old Dad Peak Management Unit, several criteria for translocation were identified:

- o The Old Dad population must be carefully monitored, every spring and fall, to ensure a surplus of females sufficient for removal;
- o A minimum of 50 adult females must be maintained in the Old Dad population; and
- o Efforts to establish and maintain a sound database on which to make future management recommendations must be implemented.

The graph below indicates bighorn sheep census levels over the past 20+ years.

FIGURE 4: CENSUS DATA FROM HELICOPTER SURVEYS OF DESERT BIGHORN SHEEP IN THE OLD DAD/KELSO PEAK AREA (CALIFORNIA DEPARTMENT OF FISH AND GAME)



Two different population estimators, by the double count method and the Bailey method utilizing sightings of marked animals, are shown where available.

The ewe count and the total count are numbers of sheep observed from the helicopter. The Bailey count estimate is based on actual observations adjusted for a ratio of collared sheep observed to total number of known sheep. In the double count method, two observers are situated at either side of the helicopter recording their own observations. The population is estimated by adjusting the total number of known sheep with the number of observations by both recorder as well as the number of observations recorded by each individual recorder. CDFG uses these actual and estimated counts to determine management actions such as the Proposed Action in this document.

Mojave National Preserve's General Management Plan has identified three management needs with regard to desert bighorn:

- To determine the need for wildlife water facilities and predator control.
- To determine the impacts of rock-climbing on sheep lambing in the Clark Mountains.
- To determine potential effects of jet noise from the proposed development of a major regional airport to be constructed a few miles from Mojave's northern boundary.

(p. 44, General Management Plan, April 2002)

Previous and Ongoing Research

Long-term demographic research has been ongoing in the eastern Mojave Desert for over 25 years. Research on the Old Dad Peak dates back to 1981. Population estimates for Old Dad have ranged from 81 (September 1995) to 212

(September 1998). The low estimate in 1995 reflects the loss of sheep from botulism. During the period for 1988 to 1996, John Wehausen (University of California, White Mountain Research Station) independently estimated a high of 131 ewes in 1992 and a low of 42 ewes in 1996. The overall trend during this period was downward, reflecting removal of 35 ewes in 1989 and 31 in 1992 for translocations and the loss of 16 ewes to botulism in 1995. Even having accounted for these losses, there was a population increase in just three out of eight years. Recruitment into the reproducing population was insufficient to compensate for adult ewe mortality in five of eight years between 1988 and 1996. Beginning in 1984, annual population estimates have been generated using telemetered animals and mark-recapture population estimators. The precision of these estimates is generally good (< 25% of the point estimate), giving researchers a high level of confidence.

CDFG has conducted helicopter surveys since 1984. From 1986 to 1991, CDFG personnel conducted detailed aerial telemetry investigations in the vicinity of Old Dad Peak. Actual observations are shown in Figure 4. In some cases, population estimates by year are also available. Although those investigations centered largely on the ecological phenomenon of sexual segregation (Bleich et al. 1997), the use of different habitats by male and female sheep was also documented, and the seasonal distribution of the sexes was determined. According to CDFG, Old Dad Peak is used predominantly by female sheep from December through July; however, during the months of August through November, use by males of Old Dad Peak increases substantially as a result of mating activities. Males are distributed primarily in the East Hills, Marl Mountains, and Kelso Mountains when they are not with females during the rut. Although some female sheep appear to be resident in the Kelso and Marl mountains, no females would be removed from those ranges for translocation to the Eagle Crags; capture activities will be restricted to Old Dad Peak, the Kerr Spur, the Petroglyph Spur, and the East Hills adjacent to Old Dad Peak.

Since the early 1980s, CDFG has monitored the population on an annual basis, estimating it consistently in the range of approximately 100 to 200 individuals in size (see Figure 4). As such, it is the largest population in California and has been a primary source of translocation stock. As noted above, in 1995 a massive loss (n=46) of sheep, including 16 adult ewes, occurred as a result of botulism poisoning. The population has been recovering since then. The 2004 Old Dad/Kelso Peak Bighorn Sheep Helicopter Survey October 6-7, 2004 observed 152 sheep, of which 60 were adult ewes, with a ratio of 67 rams to 100 ewes overall. The simultaneous double count method produced an estimated 176 total population.

CDFG has provided data in a variety of formats. The available information on desert bighorn sheep in the Old Dad Mountains and Kelso Peak includes:

- o Aerial survey data sheets, 1988-2005
- o Helicopter survey data summaries, 1981-2002
- o Bleich, Vernon C., et al. 1997. Sexual Segregation in Mountain Sheep: Resource or Predation. Wildlife Monograph 134, Journal of Wildlife Management, vol. 61(1):1-50.
- o Bleich, V.C. 1990. Desert-dwelling Mountain Sheep: Conservation Implications of a Naturally Fragmented Distribution. *In* Conservation Biology, vol. 4(4):383-390.
- o Bleich, V.C., et al. 1996. Metapopulation Theory and Mountain Sheep: Implications for Conservation. *In* D.R. McCullough, ed. Metapopulations and wildlife conservation. Island Press, Covelo, CA. pages 353-373.
- o Epps, Clinton W., et al. 2004. Effects of Climate Change on Population Persistence of Desert-Dwelling Mountain Sheep in California. *In* Conservation Biology, vol. 18(1):102-113.
- o Oehler, M.W. Sr., et al. 2003. Home ranges of female mountain sheep, *Ovis Canadensis nelsoni*: effects of precipitation in a desert

- ecosystem. *In Mammalia*, vol 67(3):385-401.
- o Schwartz, Orlando A. 1986. Genetics and the Conservation of Mountain Sheep, *Ovis Canadensis nelsoni*. *In Biological Conservation*, vol 37:179-190.
- o Singer, Francis J., et al. 2000. Restoration of Bighorn Sheep Metapopulations in and near Western National Parks. *In Restoration Ecology*, vol. 8(4S):14-24.
- o Singer, Francis J., et al. 2001. Role of Patch Size, Disease, and Movement in Rapid Extinction of Bighorn Sheep. *In Conservation Biology*, vol. 15(5):1347-1354).

RELATED LAWS, POLICIES, AND OTHER PLANNING DOCUMENTS

Service-wide and Park-Specific Legislation and Planning Documents

The NPS Organic Act directs the NPS to manage units "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner as will leave them unimpaired for the enjoyment of future generations" (16 U.S.C. § 1). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS must conduct its actions in a manner that will ensure no "derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

The Organic Act prohibits actions that permanently impair park resources unless a law directly and specifically allows for the acts. An action constitutes an impairment when its impacts "harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources and values." (Management Policies 1.4.3)

NPS Management Policies 2001 requires the analysis of potential effects of each alternative to determine if actions would impair park resources. To determine impairment, the NPS must evaluate "the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts." (Management Policies 1.4.4). The NPS must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment to the affected resources and values (Management Policies 1.4.3).

NPS units vary based on their enabling legislation, their natural and cultural resources, their missions, and the recreational opportunities appropriate within each unit and/or for specific areas within each unit. This environmental assessment analyzes the context, duration, and intensity of impacts related to the alternatives associated with conducting bighorn sheep management activities, as well as the potential for resource impairment, as required by Director's Order 12, *Conservation Planning, Environmental Impact Analysis and Decision Making*.

Mojave National Preserve was created in 1994 with passage of the California Desert Protection Act. In this enabling legislation, the Secretary of the Interior,

"shall permit hunting, fishing, and trapping on lands and waters within the preserve designated by this Act in accordance with

applicable Federal and State laws except that the Secretary may designate areas when, no hunting, fishing, or trapping will be permitted for reasons of public safety, administration, or compliance with provisions of applicable law. Except in emergencies, regulations closing areas to hunting, fishing, or trapping pursuant to this subsection shall be put into effect only after consultation with the appropriate State agency having responsibility for fish and wildlife. Nothing in the Act shall be construed as affecting the jurisdiction or responsibilities of the States with respect to fish and wildlife on Federal lands and waters covered by this title nor shall anything in the Act be construed as authorizing the Secretary concerned to require a Federal permit to hunt, fish, or trap on Federal lands and waters covered by this title." (PL 103-433 §506(b))

The 2002 *General Management Plan (GMP)* provides the overall management direction for Mojave National Preserve. Management goals for desert bighorn are listed in an earlier section of the present document.

The *Wilderness Act of 1964*, NEPA (1969), and NPS Management Policies require the assessment of the effects of an activity on wilderness values within all designated, proposed, and suitable or potential wilderness areas. *Director's Order 41: Wilderness Preservation and Management* (1999) provides guidance for the NPS wilderness management program and guides NPS efforts in meeting the letter and spirit of the 1964 Wilderness Act.

Mojave's enabling legislation designated approximately 695,200 acres of wilderness as components of the National Wilderness Preservation System. Legal descriptions and maps of the Mojave Wilderness are being finalized at present; they will eventually be filed with both houses of the US Congress.

Other Project-Related Planning Documents

Current management of bighorn sheep at Old Dad Peak is consistent with the existing BLM management plan (Vernoy et al. 1986) for this bighorn sheep management unit. In addition, management is consistent with the Sykes Act habitat management plan developed jointly by the BLM and CDFG, and that was implemented prior to transfer of BLM lands to the NPS by the California Desert Protection Act. As directed by the California Legislature in section 4700 of the Fish and Game Code, the overall goal of bighorn sheep management in California is to provide for the restoration of populations that historically existed whenever that approach is possible (CDFG 1983). If Alternative B is selected, capture and translocation of animals to Eagle Crags will be carried out according to a detailed capture plan prepared by CDFG.

ENVIRONMENTAL ASSESSMENT

This EA analyzes two Action alternatives and a No Action alternative and considers their impacts on the human and natural environment. It outlines project alternatives, describes existing conditions in the project area, and analyzes the effects of each project alternative on the environment. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1508.9).

ISSUES AND IMPACT TOPICS

Issues are related to potential environmental effects of project alternatives and were identified by the project interdisciplinary team. Once issues were identified, they were used to help formulate the alternatives and mitigation measures. Impact topics based on substantive issues, environmental statutes, regulations, and executive orders (EOs) were selected for detailed analysis. A summary of the impact topics and the rationale applied in their inclusion or dismissal is given below.

ISSUES AND IMPACT TOPICS IDENTIFIED FOR FURTHER ANALYSIS

The following relevant impact topics are analyzed in the EA. Whether each issue is related to taking action or to no action is specified.

Wildlife and Wildlife Habitat, Species of Concern Wildlife could be temporarily disrupted or displaced from flight activities. Noise caused by aircraft, particularly helicopters, could disturb the normal activities of wildlife in the project areas.

Bighorn sheep could be harassed and disturbed during flight operations, in netting, trapping, and capturing activities, and in loading them for transport. Equipping bighorn study animals with radio collars could temporarily disrupt the sheep and some mortality could occur during these efforts, as well as during transport and release.

Natural Soundscapes Natural soundscapes are not always silent but include the sounds of blowing wind, scurrying lizards, and many other sounds found in a natural environment devoid of artificial noise. Mechanical noises, such as those produced by aircraft, can drown out these natural sounds on a temporary or recurring basis.

Visitor Experience The proposed flights could temporarily disturb visitors in Wilderness who have expectations of natural quiet and solitude. The Proposed Action could also reduce opportunities wildlife viewing once bighorns are removed for the selected source population.

Wilderness The majority of desert bighorn in Mojave National Preserve can be found in designated wilderness. A minimum requirement analysis will be completed as part of this planning effort.

IMPACT TOPICS CONSIDERED BUT DISMISSED FROM FURTHER CONSIDERATION

Soils and Vegetation Soils and vegetation have been impacted by transplanted bighorn sheep herds for 30 or more years; those impacts are long established and will not be further assessed in this document. Although helicopters may land temporarily on soils and vegetation for some projects, only negligible effects would occur. Therefore, soils and vegetation were dismissed as an impact topic.

Special Status Species This project would have no effect on threatened, endangered, or sensitive species of wildlife or vegetation (Appendix B). None of the Federal or State listed species in Mojave National Preserve have been documented or are likely to occur in the Old Dad Mountains/Kelso Peak area. CDFG did not identify any special status species at Marble Mountains or Eagle Crags. This impact topic will not be further evaluated.

Water Resources, Wetlands and Floodplains Water may be needed for projects requiring trapping operations; if this is the case, this would be temporary and would have negligible effects. No landings would occur in or near water, and floodplains would not be obstructed. Therefore these topics will not be further evaluated.

Air Quality Aircraft have negligible, localized, short-term adverse effects on air quality. However, no measurable impacts are expected, therefore this topic will not be further evaluated.

Cultural Resources Implementation of the proposed bighorn management activities would have no effect on cultural resources. Therefore, this topic will not be further evaluated.

The following topics are not further addressed in this document because there are no potential effects to these resources, which are not in the project area.

- Socioeconomic resources
- Designated ecologically significant or critical areas
- Wild or scenic rivers
- Designated coastal zones
- Indian Trust Resources
- Ethnographic Resources
- Prime and unique agricultural lands
- Sites on the US Department of the Interior's
 - National Registry of Natural Landmarks
- Sole or principal drinking water aquifers

In addition, there are no potential conflicts between the project and land use plans, policies, or controls (including state, local, or Native American) for the project area. Regarding energy requirements and conservation potential, aerial operations would require the increased use of energy. Nonetheless, the energy from petroleum products required to implement action alternatives would be insubstantial when viewed in light of overall production costs and potential effects of the national and worldwide petroleum reserves.

There are no potential effects to local or regional employment, occupation, income changes, or tax base as a result of this project. The project's area of potential effect is not populated and, per EO 12898 on Environmental Justice, there are no potential effects on minorities, Native Americans, women, or the civil liberties (associated with age, race, creed, color, national origin, or sex) of any American citizen. No disproportionate high or adverse effects to minority populations or low-income populations are expected to occur as a result of implementing any alternative.

SECTION II: DESCRIPTION OF ALTERNATIVES

INTRODUCTION

This section describes the alternatives considered, including the No Action alternative. The alternatives described include mitigation measures and monitoring activities proposed to minimize or avoid environmental impacts. This section also includes a description of alternatives considered early in the process but later eliminated from further study; reasons for their dismissal are provided. The section concludes with a comparison of the alternatives considered.

ALTERNATIVE A - NO ACTION

Under this alternative, no bighorn sheep would be removed from Mojave National Preserve and the herd at Eagle Crags would not be increased by translocation. The Old Dad Mountain population would continue to be monitored by CDFG through radio telemetry and aerial surveys. According to recent census estimates, the Eagle Crags population has a sex ratio of 17 males to two females. The long-term viability of this herd is unknown.

ALTERNATIVE B - PROPOSED ACTION

Translocate Desert Bighorn Ewes from Mojave National Preserve to the Naval Air Weapons Station (NAWS) at China Lake

Under the Proposed Action by CDFG, CDFG and NAWS personnel would capture between five and 15 ewes from the Old Dad population by helicopter net-gunning techniques. It is likely that 10 bighorn sheep will be captured in a single day of flight time totaling seven hours; if the objective is not achieved within seven hours, a second day of capture activities (that will total no more than seven hours) will be initiated until the target is met. Activity involves approximately six to 14 hours of total flight time at low elevations, frequently 10 feet above ground level or lower. The maximum number of flights in the Wilderness areas would be approximately 30 to 45. The translocation team will search for female bighorn will be restricted to the Old Dad Mountain/Kelso Peak area.

CDFG proposes to capture ewes with a hand-held net gun fired from a helicopter (Krausman et al. 1985). The majority of animals will be captured in areas designated as wilderness and each capture will entail three landings: (1) to drop off the capture crew that initially will handle the animal, (2) to drop off a handling crew that will prepare the animal for transport and retrieve the capture crew, and (3) to retrieve the handling crew, and transport it to the next captured animal. At the site of each animal capture, landing will be on the same piece of ground (i.e., the helicopter landing site will be constant at each capture site). The number of total landings to occur at areas outside of the primary processing area, which will not be located in designated wilderness, would be from 30 to 45 for capture of between 10 and 15 animals.

Each animal captured would be transported to a base camp three kilometers southwest of Kelbaker Road (SW1/4 Sec. 10, T12N, R11E) and processed.

Animals will be transported via helicopter back to a stationary processing area located outside of wilderness where they will be examined by CDFG personnel. Processing personnel will include a licensed veterinarian. Blood and fecal samples will be collected from each individual, each will be weighed and standard measurements recorded, and each will be fitted with a telemetry collar. Animals will then be placed in shipping crates mounted on flat bed trucks to await transport to the Eagle Crags. If insufficient animals are captured on Day 1, those animals will be held overnight, to be supplemented with additional animals to be caught early on Day 2. In no event will animals be held longer than approximately 18 hours prior to being

transported to the Eagle Crags. The animals will then be transported by truck to the Eagle Crags. All animals captured but not transported will be released in the area near where they were captured.

The Eagle Crags population would increase to 29 animals in total - 17 males to 12 females - if 10 ewes are translocated.

The project manager will be Dr. Vern Bleich, Senior Environmental Scientist, California Department of Fish and Game, Bishop Field Office.

MITIGATION, MONITORING, AND OPERATIONS SAFETY

Mitigation measures are specific actions designed to minimize, reduce, or eliminate impacts of alternatives and to protect Mojave National Preserve resources and visitors. Monitoring activities are actions to be implemented during or following the project. The following mitigation related to aerial operations and bighorn sheep monitoring would be implemented under the action alternative, and are assumed in the analysis of effects.

Wildlife Desert bighorn sheep would be blindfolded upon capture to calm them during the transportation and tagging operations. A veterinarian would be on-site monitoring the captured desert bighorn sheep to ensure their health and well-being.

Visitor Experience and Wilderness A minimum requirement analysis has been completed as part of this EA (Appendix A). The following mitigation was developed to reduce impacts to the Wilderness areas.

Aerial operations over Wilderness areas will usually be confined to weekends due to pilot and aircraft availability. Notification of aerial operations over Wilderness will be provided to the public through the park website, press releases, and at the park visitor centers. The base of operations will all be located outside Wilderness. All ground support vehicles would be restricted to existing access roads, outside of the designated Wilderness. All drop-net trapping locations would be located outside designated Wilderness in desert washes or previously disturbed areas.

Safety A separate job safety analysis will be prepared for this operation that would include the following considerations:

- o All aerial operations would be conducted in accordance with applicable state and federal laws and policies. Only qualified and trained individuals would be permitted on the aerial operations. The capture operation will be contracted by CDFG to their prime contractor, Hawkins and Powers. Trained contractors will affix the radio collars in the field at the point of capture. The survey work will be conducted by CDFG utilizing their helicopter and pilots.
- o CDFG will conduct its own safety meeting to include personnel actively involved in the pursuit and capture of animals; additionally, personnel that will be handling animals will be experienced in those activities, and will receive additional instructions regarding placement of animals in shipping boxes.

Helicopter, Pilot and Communications All operations of helicopters must be in compliance with Federal Aviation Regulations, Part 91, and state and NPS regulations and policies. Pilots shall comply with the Contractors Federal Aviation Certificates and applicable regulations of the states of Arizona and Nevada and shall follow what are recognized as safe flying practices.

All aspects of fuel storage and handling will be in compliance with OAS 351

DM: Aviation fuel handling. When refueling, the helicopter shall remain a distance of at least 300 feet or more from animals, vehicles (other than the fuel truck), and personnel not involved in refueling. Refueling will occur at the Baker airport or at the base camp.

Helicopter operations will be consistent with CDFG air operations policies as outlined in the CDFG Operations Manual. Check-in periods will be no longer than 30 minutes, and the aircraft likely will be in sight the majority of the time.

Safety around Helicopters Along with the above stipulations, the following rules apply to ground activity around helicopters. All personnel taking part in the aerial or ground portion of the operation will be provided a safety briefing and the appropriate training, prior to the operations, including:

- a. Keep clear of helicopter rotors. Stay away from the rear of the helicopter.
- b. Approach from the front or side, but never out of the pilot's line of vision.
- c. Do not approach the helicopter until the pilot indicates you may do so.
- d. Do not approach the helicopter from any side where the ground is higher.
- e. Hold firmly onto loose articles.
- f. Never reach up or run after articles that may have blown away.
- g. Protect eyes from blowing dust by wearing protective goggles or glasses.
- h. During take off, landings and hovering operations, ground crew will stay at least 200 feet away from the helicopter.
- i. If blinded by dust or debris, stop, crouch low or sit down and wait for help.
- j. Allow helicopter personnel to load the tools.

ALTERNATIVE C: Translocate Desert Bighorn Ewes from another Source Population to the Naval Air Weapons Station at China Lake

Under Alternative C, five to 15 bighorn ewes would be translocated to the Naval Air Weapons Station at China Lake from a source population other than the Old Dad herd in Mojave National Preserve. Bighorn sheep from the herd in the Marble Mountains Wildlife Area (CDFG lands) were previously captured and translocated to Eagle Crags. Directly south of interstate highway 40, the Marble Mountains herd is thought to be smaller than that of Old Dad Peak. The Marble Mountains herd is currently estimated to have approximately 125 animals of which there would be 60% males and 40% females. The techniques used to capture, process, transport, and release animals would be the same as those proposed in Alternative B.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER EVALUATION

Alternatives considered but eliminated from further evaluation include: (1) translocate sheep from the Clark Mountain herd to Eagle Crags; (2) increase fertility of Eagle Crags herd; (3) translocate Eagle Crags herd to Old Dad, and (4) translocate even numbers of males and females. In Mojave National Preserve the Clark Mountain herd has approximately 38 animals. It is safe to assume that 60% are males and 40% are females. The first option was eliminated because of the small size of the Clark Mountain herd and potential for significant impacts to that herd. The other three options were rejected either because of prohibitively expensive costs or a lack of scientific justification.

CONSULTATION, COORDINATION, AND PERMIT REQUIREMENTS

The EA will be distributed to the public for a 30-day review period, including notification of activities proposed to occur in Wilderness. In

addition, consultation with Native American tribes will be completed during that same period.

ENVIRONMENTALLY-PREFERRED ALTERNATIVE

The environmentally preferred alternative is that which will promote NEPA, as expressed in Section 101 of NEPA. This alternative will satisfy the following requirements:

- o Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- o Assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- o Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable or unintended consequences;
- o Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- o Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and,
- o Enhance the quality of renewable resources and approach the maximum attainable recycling of exhaustible resources.

SECTION III: AFFECTED ENVIRONMENT

INTRODUCTION

This section provides a description of the existing environment in the project area and the resources that could be affected by implementing the proposed alternatives. Complete and detailed descriptions of the environment and existing use at Mojave National Preserve can be found in the *Mojave National Preserve General Management Plan* (NPS 2002) and on the Park website at www.nps.gov/moja.

LOCATION AND GENERAL DESCRIPTION OF MOJAVE NATIONAL PRESERVE

Mojave National Preserve is a 1.6 million-acre unit of the National Park Service that represents a combination of Great Basin, Sonoran, and Mojave desert ecosystems. Nowhere else in the United States can such a wide variety of desert plant life be found in such combinations and in such close proximity to one another. Mojave is located in southern California, bounded by Interstate Highways 15 and 40 approximately halfway between Las Vegas and Joshua Tree National Park. Its eastern boundary primarily follows the Nevada-California border.

NATURAL RESOURCES

The project area is characteristic of the Mojave Desert, with low precipitation (averaging 8 to 23 centimeters per year [3 to 9 inches per year]), low humidity, and wide extremes in daily temperatures. Winters are relatively short and mild, and summers are long and hot. The prevailing wind direction is from the south during the summer, and from the north during the winter.

Geology, Topography, and Soils

Mojave has a very complex and diverse geology. It is characterized by isolated mountain ranges and ridges separated by alluvium-filled, irregular large valleys. The northeast trending Providence-Mid Hills-New York Mountain ranges divide the Preserve in half. Principle valleys include Ivanpah Valley, Kelso/Cedar Wash, Lanfair Valley, Devils Playground, Piute Valley and the northern area of Fenner Valley.

Old Dad Mountain exposes pre-Cenozoic formations in the southern Cordilleran geosyncline and major structures from the Mesozoic and Neogene deformation. Three phases of deformation are evident, as well as late Triassic and/or Early Jurassic unrest. Old Dad and Kelso Peaks vary in elevation from 1200 ft. at the base of the Cowhole Mountains to nearly 4800 ft. at Kelso Peak. Old Dad Peak and the Cowholes are formed from large limestone substrate. South and east of Old Dad is volcanic material. Kelso Peaks is granitic with substantial amounts of blow sand to the southwest.

Mojave has soils with sandy textures with gravel and cobble cimas, soils with medium textures, soils with calcium carbonate (e.g., caliche) accumulations, fine textured soils found in playa prone areas, soils with a developed horizon reflecting age or formation during a different moisture regime, shallow soils, and upland soils. There are also escarpments, ephemeral streams, a large area of dunes, and a lava flow area.

Vegetation and Wildlife, Sensitive Species

Mojave National Preserve contains approximately 35 wildlife habitats supporting about 300 species of wildlife. A large portion of the Preserve is designated critical habitat for the desert tortoise (*Gopherus agassizii*), a federally threatened species. Other wildlife include 36 species of reptiles, 206 species of birds, and 47 species of mammals. Better known species are listed below.

Arizona Bell's vireo

Bendire's thrasher
Burro
California thrasher
Desert striped whipsnake
Desert tortoise
Dusky-footed woodrat
Gambel's quail
Gila monster
Golden eagle
Gray vireo
Lucy's warbler
Mohave tui chub
Mojave fringe-toed lizard
Mountain lion
Mourning dove
Mule deer
Porcupine
Prairie falcon
Regal ring-necked snake

Wildlife habitats include barren, desert scrub, desert wash, Joshua tree, and lacustrine. Vegetation communities include cismontane and desert interior dunes, Sonoran and Mojavean desert scrub, creosote bush scrub, Joshua Tree tall scrub and open woodland, Joshua tree woodland, riparian forest and woodland, desert wash riparian woodland, and smoke tree woodland and scrub.

Vegetation in the Old Dad and Kelso Peaks includes perennial species such as *Coleogyne ramosissima*, *Penstemon antirrhinoides*, *Eurotia lanata*, *Stipa speciosa*, and *Aristida* sp. Other known species include:

Ambrosia dumosa (Gray) Payne (white burrobush)
Atriplex hymenelytra (Torr.) S. Wats. (desertholly)
Baccharis L. (baccharis)
Encelia farinosa Gray ex Torr. (goldenhills)
Ephedra L. (ephedra)
Eriogonum inflatum Torr. & Frem. (Native American pipeweed)
Eriogonum Michx. (eriogonum)
Hymenoclea salsola Torr. & Gray ex Gray (white burrobush)
Larrea tridentata (Sesse & Moc. Ex DC.) Coville (creosotebush)
Lycium L. (wolfberry)
Salazaria mexicana Torr. (Mexican bladdersage)
Sphaeralcea ambigua Gray (desert globemallow)
Tetradymia glabrata Torr. and Gray (littleleaf horsebrush)
Yucca brevifolia Engelm. (Joshua tree)
Yucca schidigera Roezl ex Ortgies (Mojave yucca)

Threatened, Endangered and Sensitive Species

Mojave National Preserve has two federally listed species, desert tortoise, and Mohave tui chub. Both are also California state listed, as well as the Arizona bells vireo (*Vireo bellii arizonae*) and southwestern willow flycatcher (*Empidonax traillii*). Both bird species have been documented in the Preserve. California least Bells vireo (*Vireo bellii pusillus*) is suspected to occur in Mojave National Preserve but has not been documented. There is also potential habitat for California (or western) yellow-billed cuckoo (*Coccyzus americanus occidentalis*) but its presence is unlikely.

There are no known federally listed or proposed plant species in Mojave. *Eriogonum ericifolium* var. *thornei* (Thorne's buckwheat) is California state listed as endangered and is only known to occur in the New York Mountains at 5,500 feet.

Air Quality

Visibility is one of the most important air quality resources in the desert region and is also the most easily affected by activities that generate dust and sulfur dioxide. Source emissions near Mojave include the Army's National Training Center at Fort Irwin, Viceroy Mine near Searchlight, Nevada, the Mojave Generation Station near Laughlin, Nevada, MolyCorp Mine and Stateline Power Generation Station near Primm, Nevada, and vehicle traffic on Interstates 15 and 40.

The night sky is dark and offers visitors and researchers opportunities for star gazing mostly untainted by artificial light reflection. It is primarily impacted from traffic on the interstates and the lights from Baker, Primm, and Laughlin.

Soundscapes

Mojave is a generally quiet landscape with occasional, short-term interruptions of the natural quiet. Visitors usually experience little noise while in the backcountry. Occasional overflights of commercial jets at cruising altitudes, small private aircraft, and rare military jets at low altitudes may be heard. The Union Pacific and Southern Pacific railroad lines that traverse the Preserve are heavily used but the noise from freight trains is only occasionally audible within a few miles of the tracks.

CULTURAL RESOURCES

Historic Overview: Prehistory

Evidence of human occupation in the Mojave Desert may date back to the Pleistocene Epoch. There is certain evidence of human use beginning in the Lake Mojave Period (10,000 to 5,000 B.C.), and continuing through the Pinto Period (5,000 to 2,000 B.C.), Gypsum Period (2,000 B.C. to A.D. 500), Saratoga Springs Period (A.D. 500 TO 1,200), and Protohistoric Period (A.D. 1,000 to Euro-American Contact).

Euro-American History

Mojave National Preserve has a rich, varied history dating back to early Spanish and American exploration. An inventory of historic resources documents prehistoric and protohistoric Native American trails, Euro-American trails, wagon roads, railroads, highways, and other early transportation arteries. There is evidence of abandoned mining operations, homesteading, settlements associated with mining and the railroads, railroad grades and railway structures, military operations against the Native Americans, and military training camps during World War II. Ranching-grazing operations continue to this day.

SOCIOECONOMIC RESOURCES, RECREATION AND VISITOR USE

The eastern Mojave Desert has long attracted visitors with its recreational opportunities including hunting, trapping, rockhounding, hiking, camping, and sightseeing. Soda Springs has been variously used as a public bathing establishment, base camp for gold mining, and a health resort. It is now home to the California Desert Studies Consortium of California State University, Fullerton. Mitchell Caverns has been a tourist attraction since the 1930s. It is managed by the State of California as part of the Providence Mountains State Recreation Area. In addition, the Sweeney Granite Mountains Desert Research Center is managed by the University of California, Riverside and hosts desert researchers from all over the world.

Mojave offers visitors an opportunity for seclusion and a sense of wilderness even while traveling in a vehicle. Roads originally built for mining and ranching give visitors a chance to drive into many remote locations. The Park also has several major dune systems, among which the best known are the Kelso Dunes. Other recreational activities include cultural sites (e.g., abandoned mining districts), mountain ranges with cooler summer temperatures

and forested areas, volcanic cinder cones, lava flows, rock outcrops, and unique wildlife and vegetation. Access comes in several forms: hiking, equestrian use, bicycling, four-wheel drive touring, motorcycles and all-terrain vehicles on open roads, aircraft, backcountry use and roadside vehicle camping.

Hunting, in accordance with the California Desert Protection Act, is authorized within Mojave. California Department of Fish and Game determines and manages seasons, permits, hunting regulations and tags. Bighorn hunting season within Mojave National Preserve is managed by CDFG in cooperation with the NPS. Limited numbers of tags for desert bighorn sheep are issued each year by lottery; one additional tag is auctioned to the highest bidder. The number of tags is based on herd population data and habitat conditions.

WILDERNESS

The California Desert Protection Act of 1994 established approximately 695,000 acres of wilderness in Mojave National Preserve. Total wilderness acreage will be calculated once the wilderness boundaries have been finalized and approved by Congress. The National Park Service manages wilderness areas with the maximum statutory protection allowed - to preserve their wilderness character, and to gather information on their use and enjoyment as wilderness. Because of the general prohibition of mechanized or motorized equipment in wilderness, a minimum requirements analysis may be required for alternatives requiring such equipment or transport. Mojave National Preserve is a member of the Desert Managers Group and, as such, has adopted and implemented "Principles for Wilderness Management in the California Desert." These principles promote consistency in desert wilderness management by the many land-managing agencies throughout southeastern California.

SECTION IV: ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section presents the likely beneficial and adverse effects to the natural and human environment that would result from implementing the alternatives under consideration. This section describes short-term and long-term effects, direct and indirect effects, cumulative effects, and the potential for each alternative to impair park resources. Interpretation of impacts in terms of their duration, intensity (or magnitude), and context (local, regional, or national effects) are provided where possible.

METHODOLOGY

This section contains the environmental impacts, including direct and indirect effects and their significance to the alternatives. It also assumes that the mitigation identified in the *Mitigation and Monitoring* section of this EA would be implemented under the action alternative.

Impact analyses and conclusions are based on NPS staff knowledge of resources and the project area, review of existing literature, and information provided by experts in the NPS or other agencies. Any impacts described in this section are based on preliminary design of the alternatives under consideration. Effects are quantified where possible; in the absence of quantitative data, best professional judgment prevailed.

CRITERIA AND THRESHOLDS FOR IMPACT ANALYSES

The following are laws, regulations, and/ or guidance that relates to the evaluation of each impact topic.

Wildlife, Wildlife Habitat, and Sensitive Species

Laws, Regulations, and Policies. The NPS Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted by the NPS to mean native animal life should be protected and perpetuated as part of the recreation area's natural ecosystem. Natural processes are relied on to control populations of native species to the greatest extent possible. The restoration of native species is a high priority in national park units. Management goals for wildlife include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and ecological integrity of plants and animals.

Impact Indicators, Criteria, and Methodology. The impacts of wildlife were evaluated in terms of impacts to individual animals and wildlife habitat. Specific localized impacts were estimated based on knowledge garnered from similar past activities.

The following are standards used by the NPS in interpreting the level of impact to wildlife:

Negligible impacts: No species of concern is present; no impacts or impacts with only temporary effects are expected.

Minor impacts: Nonbreeding animals of concern are present, but only in low numbers. Habitat is not critical for survival; other habitat is available nearby. Occasional flight responses by wildlife are expected, but without interference with feeding, reproduction, or other activities necessary for survival.

Moderate impacts: Breeding animals of concern are present; animals are present during particularly vulnerable life-stages, such as migration or winter; mortality or interference with activities necessary for survival expected on an occasional basis, but not expected to threaten the continued existence of the species in the park.

Major impacts: Breeding animals are present in relatively high numbers, and/or wildlife is present during particularly vulnerable life stages. Habitat targeted by actions has a history of use by wildlife during critical

periods, but there is suitable habitat for use nearby. Few incidents of mortality could occur, but the continued survival of the species is not at risk.

Impairment: The impact would contribute substantially to the deterioration of natural resources to the extent that the park's wildlife and habitat would no longer function as a natural system. Wildlife and its habitat would be affected over the long-term to the point that the park's purpose (Enabling Legislation, *General Management Plan*, *Strategic Plan*) could not be fulfilled and resource could not be experienced and enjoyed by future generations.

In the absence of quantitative data concerning the full extent of actions under a proposed alternative, best professional judgment prevailed.

CRITERIA AND THRESHOLDS FOR IMPACT ANALYSES OF ALL OTHER ISSUES

Impacts to soundscapes, visual resources, safety, visitor experience, and wilderness were analyzed using the best available information and best professional judgment of park staff.

Terms referring to impact intensity, context, and duration are used in the effects analysis. Unless otherwise stated, the standard definitions for these terms are as follows:

Negligible impacts: The impact is at the lower level of detection; there would be no measurable change.

Minor impacts: The impact is slight but detectable; there would be a small change.

Moderate impacts: The impact is readily apparent; there would be a measurable change that could result in a small but permanent change.

Major impacts: The impact is severe; there would be a highly noticeable, permanent measurable change.

Localized Impact: The impact occurs in a specific site or area. When comparing changes to existing conditions, the impacts are detectable only in the localized area.

Short-Term Effect: The effect occurs only during or immediately after implementation of the alternative.

Long-Term Effect: The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more and could be beneficial or adverse.

IMPAIRMENT ANALYSIS

Impairment to park resources and values are analyzed in this section. Impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be more likely to constitute impairment to the extent that it affects a resource or value whose conservation is key to the cultural or natural integrity of the park or that is a resource or value needed to fulfill a specific purpose identified in the enabling legislation. An impact would be less likely to constitute impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values that cannot be reasonably mitigated.

A determination of impairment is made in the "Conclusion" section of all natural and cultural resource impact topics of this document. Impairment statements are not required for recreational values/visitor use and experience or safety-related topics.

Cumulative Effects

Cumulative effects are the direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action

(40 CFR Part 1508.7). Guidance for implementing NEPA (Public Law 91-190, 1970) requires that federal agencies identify the temporal and geographic boundaries within which they will evaluate potential cumulative effects of an action and the specific past, present, and reasonably foreseeable projects that will be analyzed. This includes potential actions within and outside the recreation area boundary. The geographical boundaries of analysis vary depending on the impact topic and potential effects. While this information may be inexact at this time, major sources of impacts have been assessed as accurately and completely as possible, using all available data.

The primary activities with the potential to cumulatively affect the resources relate to the wilderness resource and the impacts from air tours, administrative overflights and NPS management activities, and other human-generated noise such as boat and personal water craft use. Past, present and future bighorn sheep management activities, habitat loss and fragmentation are also considered in evaluating cumulative impacts.

IMPACTS TO WILDLIFE, WILDLIFE HABITAT, SENSITIVE SPECIES OF CONCERN

Alternative A (No Action)

The No Action alternative will have no impacts on wildlife, including desert bighorn sheep and desert tortoise, in Mojave National Preserve. Both species will continue to exist in Mojave National Preserve without interruption.

The Eagle Crags population may continue to decline to extirpation. There will be no opportunity to determine areas to which females move or utilize. The population may become extirpated.

According to CDFG and BLM records, 25 sheep were translocated from Old Dad Peak to Eagle Crags in 1983 and then augmented with another 16 from Old Dad Peak in 1987. Currently, the Eagle Crags population appears to have a sex ratio that, for whatever reason, is biased strongly toward males. Indeed, helicopter surveys conducted in 2001 and 2002 have borne this out; fewer than 10% of the animals located were females. Disease investigations (based on animals captured for telemetry purposes in 2002) have not produced evidence that any sex-specific pathogen may be responsible for this phenomenon. Further, there is no evidence that sex-specific predation has been issue, but that possibility cannot be ruled out. Use of telemetry on collared males during rut has failed to reveal areas in which females may be concentrated. Thus, we surmise that the population structure is as observed (perhaps the result of some random series of events), and that an influx of females into the population will enhance the reproductive base and thereby increase the likelihood of population persistence. Further, the addition of marked females to the population will facilitate efforts to locate areas used predominantly by females during sexual segregation, assuming the newly marked individuals behave similarly to the extant local population. An understanding of the way that females select habitat in the Eagle Crags (or on Fort Irwin, located adjacent to the China Lake Naval Air Weapons Station) has important implications for the conservation program and for the persistence of this population. Survival of telemetry collared sheep has been high but some sheep dispersed to adjacent ranges, including the Panamint Range on the west side of Death Valley National Park.

If the number of females composing the Eagle Crags population is, in fact as low as census data indicate, CDFG asserts that the population will probably not persist in the long term. Stochastic events have the potential to more than offset reproductive gains in any particular year, given the apparently very low reproductive base. Hence, it is likely that the Eagle Crags population may "wink out" as a result of those stochastic events. Such an

outcome would have negative implications for the maintenance of a metapopulation structure among geographic areas occupied by mountain sheep in southwestern Inyo and northwestern San Bernardino counties. Loss of the Eagle Crags population would undo the apparent benefits (increased gene flow, pioneering behavior) that appear to have occurred as a result of the original translocation. Hence, efforts to restore the structure of the metapopulation would be unsuccessful, and the probability of persistence of small, isolated populations of mountain sheep in areas adjacent to Eagle Crags would be reduced. In short, the outcome could include not only the loss of the Eagle Crags population, but also the potential loss of other, nearby populations. It is the opinion of CDFG that such occurrences would negatively impact the conservation of mountain sheep.

Alternative B: Translocate Bighorn Sheep from Old Dad Mountain to Eagle Crags

According to CDFG, mountain sheep occupying the Old Dad Peak ecosystem represent a large and healthy population. CDFG has provided incomplete information regarding past translocation numbers, dates of past translocations, and destination locations of past translocation efforts specific to the Old Dad herd as a source population. It is known that, in 1989, 35 ewes were removed for translocation. An additional 31 females were removed in 1992. Since the early 1980s, the population has been monitored on an annual basis, and has been estimated consistently in the range of approximately 100 to 200 individuals in size (Figure 1). As such, it is the largest population in California and has been the primary source of translocation stock. In 1995, a massive loss (n=46) of sheep, including 16 adult ewes, occurred as a result of botulism poisoning. The population has been recovering since then. The 2004 Old Dad/Kelso Peak Bighorn Sheep Helicopter Survey October 6-7, 2004 observed 152 sheep, of which 60 were adult ewes, with a ratio of 67 rams to 100 ewes. The simultaneous double count method produced an estimated 176 total for the Old Dad/Kelso Peak herd. Risks to the population that are associated with this translocation are minimal, in the sense that 25 percent of the female cohort is proposed to be removed for this effort. Based on the demonstrated record of management of this population, risks to population persistence are minimal in both the short and long terms, and replacement of removed animals is likely to occur within one year, especially given the amount of forage available as a result of recent rains and the influence of density-dependent processes. Removal of 10 ewes from the Old Dad/Kelso Peak herd would, based on actual number of ewes observed in 2004, reduce the total number of ewes to 50, just meeting CDFG's criteria for translocation (p. 10).

During the last year, mountain sheep have been observed in areas removed from Eagle Crags including near Little Lake, Inyo County, on the west side of China Lake Naval Weapons Station, or essentially opposite to the position of Eagle Crags on the east side. Genetic investigations indicate that haplotype E was derived from animals observed at Little Lake; that is the most common haplotype at Old Dad Peak, the source of the majority of animals that were translocated to the China Lake Naval Air Weapons Station during the 1980s. CDFG and NAWS assert that this finding is consistent with the notion that animals translocated from Old Dad Peak to the Naval Air Weapons Station have pioneered new geographic areas, suggesting that the translocated sheep have been important in facilitating gene flow among other populations in the vicinity of Eagle Crags and the Argus Range. One rationale for translocating animals to Eagle Crags was to enhance the possibility of gene flow between adjacent ranges, and that objective appears to have been met. Further, movements between adjacent ranges will be enhanced merely by the fact that more animals are present in Eagle Crags as a result of the proposed translocation. This has positive implications for the restoration and maintenance of a metapopulation structure for mountain sheep inhabiting southwestern Inyo and northwestern San Bernardino counties, and is consistent

with the California Department of Fish and Game's statewide management objectives for mountain sheep.

At Eagle Crags, the number of female sheep will be augmented by up to 15 individuals. Information on habitat use, seasonal distribution and survival of female sheep will be obtained. Productivity of the population will be enhanced.

Short-term risks to the subject population may include the spread of diseases. Past serological, bacterial, and virological investigations have not yielded evidence of diseases that would have serious implications for the population at Old Dad Peak. Indeed, the performance of that population over the past 25 years is consistent with the hypothesis that diseases are not a factor of concern at Old Dad Peak and, hence, disease is not considered a significant risk to the sheep population at Eagle Crags.

Alternative C: Translocate Bighorn Sheep from Another Source Population to Eagle Crags

This alternative will have no negative impact on the Old Dad herd in Mojave National Preserve. Impacts to the Marble Mountains herd might be similar to those identified for the Old Dad/Kelso Peak herd in Alternative B. Because the Marble Mountain herd is smaller than the Old Dad/Kelso Peak herd, impacts may be more pronounced. It must be noted that the population estimates in this EA are not actual herd counts; therefore, the extent of these impacts to the Marble Mountain herd can only be speculated.

Impacts to the Eagle Crags population would be the same as those identified for Alternative B.

Impairment

The desert bighorn herds at Old Dad Mountains and Kelso Peak, Marble Mountains, and Eagle Crags are all manipulated wildlife populations. It is not possible to define a range of natural variability for manipulated herds; in consequence, impairment to desert bighorn cannot be concluded for either Alternative B or Alternative C. Impacts to other wildlife at these locations from either of the Action alternatives are inconclusive. These herds were established back in the over 20 to 30 years ago. Any impacts they may have had to other wildlife have been long established by now. There is no evidence of bighorn sheep translocations causing the extirpation of other wildlife, therefore impairment to wildlife cannot be concluded from Alternatives B or C.

IMPACTS TO NATURAL SOUNDSCAPES

Alternative A: No Action

There will be no impacts to the natural soundscapes of Mojave National Preserve or to that of Eagle Crags from the No Action alternative.

Alternative B: Translocate Bighorn Sheep from Old Dad Mountain to Eagle Crags

Impacts to the natural soundscape will be temporary and can be mitigated through scheduling and operational protocols.

Alternative C: Translocate Bighorn Sheep from Another Source Population to Eagle Crags

Impacts to natural soundscapes in Marble Mountains would be similar to impacts to Mojave National Preserve.

Impacts to the Eagle Crags population would be the same as those identified for Alternative B.

Impairment

All identified impacts under Alternatives A, B, and C are non-existent, negligible, or mitigable. None of the alternatives will adversely impact the natural soundscapes or, therefore, result in impairment.

IMPACTS TO VISUAL RESOURCES

Alternative A: No Action

No Action will have no impacts on the visual resources of Mojave National Preserve or Eagle Crags.

Alternative B: Translocate Bighorn Sheep from Old Dad Mountain to Eagle Crags

Dust and vehicle emissions will have a minor, temporary negative impact to the viewshed.

No impacts to the visual resources of Eagle Crags have been identified.

Alternative C: Translocate Bighorn Sheep from Another Source Population to Eagle Crags

Impacts to visual resources at Marble Mountains might be similar to those identified for Old Dad Mountain and Kelso Peak.

No impacts to the visual resources of Eagle Crags have been identified.

Impairment

All identified impacts under Alternatives A, B, and C are non-existent, negligible, or mitigable. None of the alternatives will adversely impact the visual resources of Mojave National Preserve or, therefore, result in impairment.

IMPACTS TO VISITOR EXPERIENCE

Alternative A: No Action

No impacts to visitor use in Mojave National Preserve

Not applicable - Eagle Crags is not accessible to the general public.

Alternative B: Translocate Bighorn Sheep from Old Dad Mountain to Eagle Crags

The Proposed Action will likely diminish the visitor wilderness experience because of the interruption of solitude and natural quiet. These impacts are minor, temporary, and therefore can be restored. There is the possibility of diminished hunting opportunities for bighorn at least in the short term.

Not applicable - Eagle Crags is not accessible to the general public.

Alternative C: Translocate Bighorn Sheep from Another Source Population to Eagle Crags

Impacts to visitor experience at Marble Mountain might be similar to those identified for Old Dad Mountain/Kelso Peak. There is the possibility of

diminished hunting opportunities for bighorn sheep in the short term at Marble Mountain.

Not applicable - Eagle Crags is not accessible to the general public.

Impairment

All identified impacts under Alternatives A, B, and C are non-existent, negligible, or mitigable. None of the alternatives will adversely impact the visitor experience. It can, therefore, be concluded that neither Alternatives A, B, nor C will result in impairment to visitor experiences in Mojave National Preserve.

IMPACTS TO SAFETY

Alternative A: No Action

No impacts to safety in Mojave National Preserve or Eagle Crags. Moreover, Eagle Crags is not accessible to the general public.

Alternative B: Translocate Bighorn Sheep from Old Dad Mountain to Eagle Crags

Safety risks in Mojave National Preserve and Eagle Crags can be mitigated by implementing safety standards and procedures as defined in Alternative B. Moreover, Eagle Crags is not accessible to the general public.

Alternative C: Translocate Bighorn Sheep from Another Source Population to Eagle Crags

Same as Alternative B.

Impairment

All identified impacts under Alternatives A, B, and C are non-existent, negligible, or can be minimized. None of the alternatives will compromise human safety. It can, therefore, be concluded that neither Alternatives A, B, nor C will result in impairment to human safety in Mojave National Preserve.

IMPACTS TO CULTURAL RESOURCES

Alternative A: No Action

No impacts to prehistoric or historic cultural resources in Mojave National Preserve or Eagle Crags.

Alternative B: Translocate Bighorn Sheep from Old Dad Mountain to Eagle Crags

It is extremely unlikely that there would be any adverse effects on prehistoric or historic cultural resources resulting from the capture operations. Similarly, the staging compound can be placed to avoid all cultural resources.

Alternative C: Translocate Bighorn Sheep from Another Source Population to Eagle Crags

Same as for Alternative B.

Impairment

All identified impacts under Alternatives A, B, and C are non-existent or

avoidable. None of the alternatives will compromise the cultural resources of the park. It can, therefore, be concluded that neither Alternatives A, B, nor C will result in impairment to cultural resources in Mojave National Preserve.

IMPACTS TO WILDERNESS

Alternative A: No Action

No impacts to designated wilderness in Mojave National Preserve.

Eagle Crags is an active military test and training facility and does not contain wilderness.

Alternative B: Translocate Bighorn Sheep from Old Dad Mountain to Eagle Crags

This alternative will have minor, temporary negative impacts to wilderness at Old Dad Mountains/Kelso Peak.

Eagle Crags is an active military test and training facility and does not contain wilderness.

Alternative C: Translocate Bighorn Sheep from Another Source Population to Eagle Crags

Marble Mountains is a California Wildlife Area managed by the California Department of Fish and Game. It does not have federally designated wilderness.

Eagle Crags is an active military test and training facility and does not contain wilderness.

Impairment

Alternative B will have temporary negative impacts to wilderness values at Old Dad Mountains/Kelso Peak. These impacts can be minimized and/or mitigated. It can, therefore, be concluded that none of the alternatives will have adverse impacts to, or lead to impairment of wilderness.

TABLE 3: COMPARATISON OF IMPACTS OF ALL ALTERNATIVES

Impact Issue	No Action Alternative (A)	Propose to Translocate from Old Dad/Kelso Peak to Eagle Craggs (B)	Proposal to Translocate from Another Source to Eagle Craggs (C)
Wildlife, Wildlife Habitat, Sensitive Species of Concern	No impacts at Mojave National Preserve.	Impacts to Old Dad herd are minimal to significant, depending on the analysis, and short- to medium-term in duration. This is a manipulated population with recurrent human intervention. The herd will recover within the medium term. Based on previous CDFG management actions, if the herd does not recover, it is assumed CDFG will intervene to mitigate impacts. There will be no significant impacts to the Old Dad/Kelso Peak herd over the long term.	Impacts to Marble Mountain population are minimal to significant, depending on the analysis, and short- to medium-term in duration. There is a potential for these impacts to be more pronounced on the Marble Mountains herd than the Old Dad/Kelso Peak herd.
	Potential to extirpate Eagle Craggs population.	Eagle Craggs population will be augmented. There is also a potential to enhance productivity of the population. Minor short-term risks to subject population including the unlikely spread of diseases at Old Dad and Eagle Craggs.	Same as Alternative B.
Natural Soundscapes	No impacts at Mojave National Preserve.	Temporary impacts to Mojave National Preserve that can be mitigated through scheduling and operational protocols.	Temporary impacts to Marble Mountains Wildlife Area that can be mitigated through scheduling and operational protocols.
	No impacts at Eagle Craggs.	No impacts to the natural soundscape of Eagle Craggs.	No impacts to the natural soundscape of Eagle Craggs.

Impact Issue	No Action Alternative (A)	Propose to Translocate from Old Dad/Kelso Peak to Eagle Crag (B)	Proposal to Translocate from Another Source to Eagle Crag (C)
Visual Resources	No impacts to the visual resources of Mojave National Preserve.	Minor, temporary impacts from dust and vehicle emissions. Fewer desert bighorn available for wildlife viewing.	Minor, temporary impacts from dust and vehicle emissions. Fewer desert bighorn available for wildlife viewing.
	No impacts to the visual resources of Eagle Crag.	No impacts to the visual resources of Eagle Crag.	No impacts to the visual resources of Eagle Crag.
Visitor Experience	No impacts to visitor use in Mojave National Preserve	This alternative will likely diminish the visitor wilderness experience because of the interruption of solitude and natural quiet. These impacts are minor, temporary, and therefore can be restored.	Same as B.
	Eagle Crag is not accessible to the general public.	Eagle Crag is not accessible to the general public.	Eagle Crag is not accessible to the general public.
Safety	No impacts to safety in Mojave National Preserve.	Impacts mitigated by safety standards/procedures.	Same as B.
	No impacts to safety at Eagle Crag.	No impacts to safety at Eagle Crag.	No impacts to safety at Eagle Crag.
Cultural Resources	No impacts to prehistoric or historic cultural resources in Mojave National Preserve.	No adverse effects on prehistoric or cultural resources in Mojave National Preserve.	Unknown but potentially similar to Alternative B but for Marble Mountains.
	No impacts to cultural resources at Eagle Crag.	No impacts to cultural resources at Eagle Crag.	No impacts to cultural resources at Eagle Crag.
Wilderness	No impacts to designated wilderness in Mojave National Preserve.	This alternative will have minor, temporary negative impacts to wilderness.	If the herd in the Providence Mountains is chosen as the source population, this alternative would have greater negative impacts to the resources than Alternative B.

Impact Issue	No Action Alternative (A)	Propose to Translocate from Old Dad/Kelso Peak to Eagle Crag (B)	Proposal to Translocate from Another Source to Eagle Crag (C)
	Eagle Crag is an active military test and training facility and does not contain wilderness.	Eagle Crag is an active military test and training facility and does not contain wilderness.	Eagle Crag is an active military test and training facility and does not contain wilderness.

CUMULATIVE IMPACTS

Alternative A

By maintaining the status quo, the No Action Alternative will not change the dynamics of the Old Dad/Kelso Peak herd. The skewed sex ratio of the Eagle Crags herd will likely persist, increasing its potential for extirpation. The State of California's efforts to reintroduce bighorn sheep in historical ranges throughout the State will suffer a setback as a result. It is not known how CDFG might counterbalance this loss but possibilities include introducing bighorn in other areas. Because the Old Dad/Kelso Peak herd has been used historically as a source population for bighorn introductions, it will likely be considered as such again. If CDFG attempts a new introduction somewhere other than Eagle Crags, it will need to cull substantially more than 10 bighorn, including both females and males, and will likely consider the Old Dad/Kelso Peak herd as its source population.

Alternative B

The Proposed Action will relocate approximately 10 female bighorn sheep from Old Dad/Kelso Peak to Eagle Crags. CDFG hopes to balance the sex ratio of the Eagle Crags herd and improve its viability with this augmentation of female sheep. Adverse impacts to the Old Dad/Kelso Peak herd are expected to be temporary and recoverable. Habitat conditions at Old Dad/Kelso Peak may improve slightly but, because this would be temporary until the herd had regained its numbers, the overall impacts are considered negligible. In summary, no cumulative impacts from the Proposed Action have been identified.

Alternative C

Translocating sheep to Eagle Crags from another source population - specifically, Marble Mountains - will shift the adverse impacts identified in Alternative B from the Old Dad/Kelso Peak herd to the Marble Mountains population. Because the Marble Mountain herd has been estimated to be smaller than the Old Dad/Kelso Peak herd, culling sheep will have more pronounced adverse impacts and the herd is expected to take longer to recover from this loss. The Old Dad/Kelso Peak herd and its habitat will be unaffected. As with the Proposed Action, Alternative C is not expected to have cumulative impacts.

IMPAIRMENT

No impairment to the resources reviewed in this environmental assessment was identified. Most of the impacts identified are negligible, temporary, and/or avoidable or can be minimized. The full extent of impacts to the desert bighorn herds at Old Dad Mountains/Kelso Peak, Marble Mountains, and Eagle Crags is unknown and cannot be measured. These herds were established by human intervention and are regularly manipulated, are hunted annually, and have unnatural population dynamics. By definition, impairment cannot result with regard to a resource that has already been altered through human intervention. Both Alternatives B and C propose additional human intervention and manipulation and, therefore, will not impair these herds of bighorn sheep. Alternative A, the No Action, does not change the status quo and will likewise not lead to impairment.

ENVIRONMENTALLY PREFERRED ALTERNATIVE

Alternative B best meets the criteria that defines an environmentally preferred alternative. Between the three alternatives presented, this alternative has the least amount of adverse impacts to the source population while achieving the initial desired result of enhancing the Eagle Crags herd and correcting for its skewed sex ratio. The Old Dad/Kelso Peak herd is more numerous than the Marble Mountains herd and would, therefore, more readily

recover from a reduction in ewes. Under Alternative C, it is also unknown what impacts to cultural resources might be sustained in the Marble Mountains. While Alternative A has no adverse impacts to the Old Dad/Kelso Peak herd, under its implementation the Eagle Crags herd would more rapidly face extirpation.

This alternative offers the greatest potential contribution to the long-term survival of desert bighorn sheep in California, to be enjoyed by present and future generations. It provides the best chance to sustain the Eagle Crags herd. It also presents short- to medium-term adverse but recoverable impacts to the Old Dad/Kelso Peak herd at Mojave National Preserve. Because the Old Dad/Kelso Peak herd is estimated to be larger than the Marble Mountains herd and because of the size of this estimate, the Old Dad/Kelso Peak herd has a good chance of recovering from the loss of five to 15 ewes. At the same time, the Eagle Crags herd would be augmented and, therefore, have a greater potential for survival.

By furthering the survival of bighorn sheep in California, the Proposed Action would enhance wildlife populations and species diversity. It would restore a culturally significant element of California's history and prehistory. Abundant herds of desert bighorn offer opportunities for hunting, another culturally important activity in this region. These herds occupy historical ranges of desert bighorn; their impacts on the land are similar to the impacts left by native populations over the centuries. They do not present undue risks to human health or safety. Their impacts to the habitat, like those of their historical predecessors, fit into the balance of the ecosystem. Sustaining bighorn populations in places such as Mojave National Preserve and Marble Mountains also provides wildlife viewing opportunities to the public. Although Eagle Crags is not accessible to the public, the viability of this herd contributes to the long-term recovery of bighorn in the State, including other regions where bighorn are visible to the public.

Alternative B presents the least potential damage to the biological and physical environment of Mojave National Preserve and Marble Mountain while improving the Eagle Crags herd's chances of survival. It has the best potential for enhancing historic and cultural components of California history and augmenting the natural resources of the State.

SECTION V: COORDINATION AND CONSULTATION

A 30-day public scoping period occurred between August 4 and September 4, 2003, through a press release (Appendix C). One comment was received during the review period concerning the impacts the project activities would have on desert bighorn sheep. The three alternatives presented in this document were formulated and agreed upon in 2005 through interagency cooperation between NPS and CDFG.

Public notice of the availability of this environmental assessment will be published in local newspapers, and on the Mojave National Preserve Internet Web site (<http://www.nps.gov/moja>). Individuals and organizations could request the environmental assessment in writing, by phone, or by e-mail. The environmental assessment was circulated to various federal and state agencies, individuals, businesses, and organizations on the park's mailing list for a 30-day public review period. Copies of the environmental assessment were made available at area libraries.

A copy of the environmental assessment can be obtained by direct request to:

Mojave National Preserve
Attention: Bighorn Sheep Translocation EA
2701 Barstow Road
Barstow, CA 92311
(760) 252-6101

SECTION VI: LIST OF PREPARERS AND CONSULTANTS

Mojave National Preserve
Danette Woo, Environmental Compliance Specialist
Debra Hughson, Science Advisor
Larry Whalon, Chief of Resource Management
Robert Bryson, Park Archeologist/Cultural resources Lead

California Department of Fish and Game
Vernon Bleich, Senior Environmental Scientist

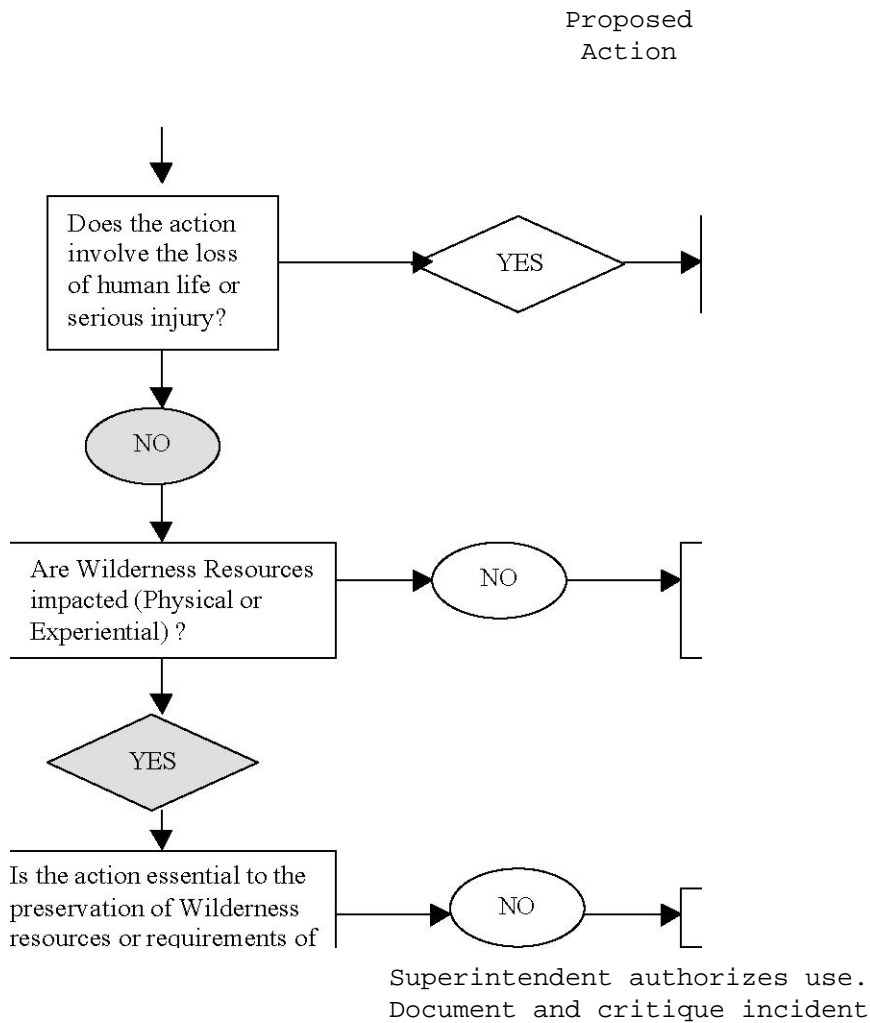
Naval Air Weapons Station, China Lake, California
Thomas Campbell, Wildlife Biologist

SECTION VI: LIST OF REFERENCES

- BLM & CDFG (US Department of the Interior, Bureau of Land Management and California Department of Fish and Game). 1989. Old Dad Peak Mountain Sheep Habitat Management Plan. Needles and Bishop, California.
- Bleich, V. C., R. T. bowyer, and J. D. Wehausen. 1997. Sexual segregation in mountain sheep: resources or predation? *Wildlife Monographs* 134:1-50.
- Bleich, Vernon C., Christina D. Hargis, Jeffrey A. Keay, John D. Wehausen. 1991. Interagency Coordination and the Restoration of Wildlife Populations. *In* Natural Areas and Yosemite: Prospects for the Future. National Park Service, Denver Service Center, Denver, Colorado. P. 277-284.
- California Department of Fish and Game. 1983. A Plan for Bighorn Sheep. Sacramento, California.
- California Department of Fish and Game. 1987. Mountain Sheep Management Plan: Old Dad Peak Management Unit. Prepared by Vernon C. Bleich, Robert L. Vernoy, and Richard A. Weaver.
- California Department of Fish and Game. 1994. Helicopter flight survey, unpublished data.
- California Department of Fish and Game. ***California T&E Species and Species of Special Concern.***
- Dunne, George C. 1977. Geology and Structural Evolution of Old Dad Mountain, Mojave Desert, California. *In* Geological Society of America Bulletin: Vol. 88, No. 6, pp. 737-748.
- Epps, C. W., V. C. Bleich, J. D. Wehausen, and S. G. Torres. 2003. Status of bighorn sheep in California. *Desert Bighorn Council Transactions* 47:20-35.
- NPS (US Department of the Interior, National Park Service). 2002. General Management Plan and Final Environmental Impact Statement. Barstow, California.
- National Archives and Records Administration. 1994. California Desert Protection Act (Public Law 103-433). Accessed online at: <http://www.gpoaccess.gov/plaws/index.html>.
- Torres, S. G., V. C. Bleich, and J. D. Wehausen. 1994. Status of Bighorn Sheep in California, 1993. 1994 Desert Bighorn Council Transactions.
- Wehausen, John D. 1997. Mountain Sheep at Old Dad Peak: An Analysis of Population Dynamics. Unpublished report.
- Wehausen, John D. 1992. Demographic Studies of Mountain Sheep in the Mojave Desert: Report IV. University of California White Mountain Research Station at Bishop, California, and California Department of Fish and Game.

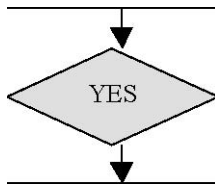
APPENDIX A

MINIMUM TOOL REQUIREMENT ANALYSIS - PART 1



Proceed with project through park compliance
process

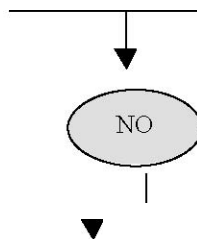
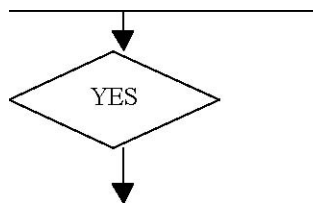
Disapprove
other laws and policies?
40



Is the action covered by an approved Wilderness Plan (or like plan?)



Is the proposed action covered by a CE, EA/FONSI, or EIS/ROD?



Proceed with project through park review process
 Proceed with project through park review process



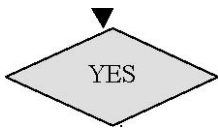
Defer until compliance is completed.

MINIMUM TOOL REQUIREMENT ANALYSIS
PART 2

Is the Action essential to meet planned Wilderness Objectives?



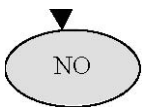
Do not proceed



Can the action be accomplished outside wilderness?



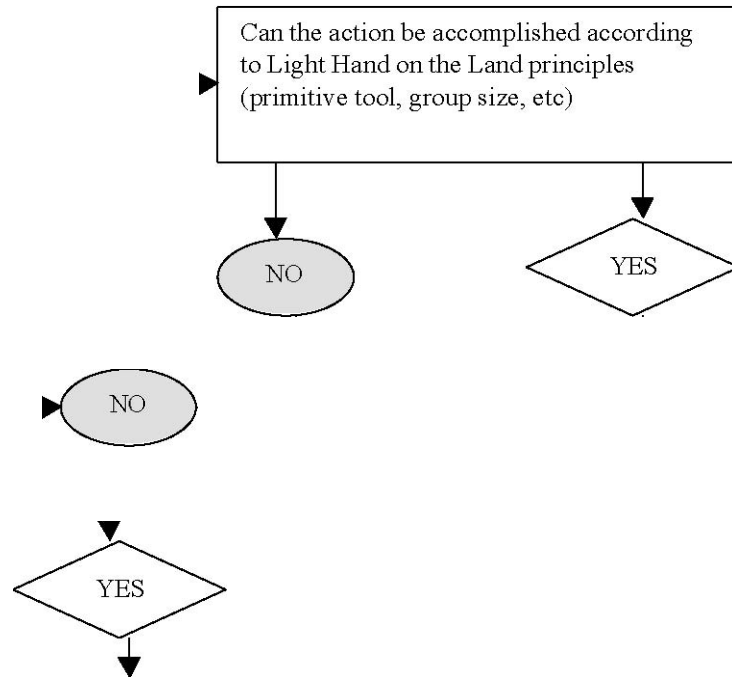
Conduct outside wilderness



Determine alternative that has the least impact on Wilderness character and resources

List alternative ways to accomplish the action

Can the action be accomplished through visitor education?



Then use:

Interpretation Authority of Resource Leave No Trace Wilderness Ethics

Select appropriate mechanized tool. Non-routine uses only or administrative research.

Select appropriate minimum tool and skills

▼ _____ ▼

**Minimum Requirement Analysis
Decision Screening Questions**

- 1 Does your action insure that wilderness is not occupied and modified?
- 2 Does your action maintain or move the Wilderness toward less human influence within legal constraints?
- 3 Does your rationale allow Wilderness to retain solitude and elements of surprise and discovery?
- 4 Did you evaluate the traps of making decisions based on economy, convenience, comfort, or commercial value?
- 5 Did you look beyond the short-term outputs to ensure that future generations will be able to use and enjoy the benefits of an enduring resource of Wilderness?
- 6 Does the alternative support the Wilderness resource in its entirety rather than maximizing an individual resource?
- 7 Do you recognize the unique characteristics for this particular Wilderness?
- 8 Does the action prevent the effects of human activities from dominating natural conditions and processes?

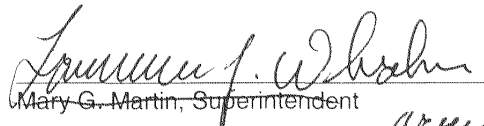
APPENDIX B

Minimum Requirements Analysis of the project proposal for Wilderness Preservation and Management

1. **Project Name:** The Translocation of Desert Bighorn Sheep from Mojave National Preserve to the Naval Air Weapons Station, China Lake, California.
2. **Analysis Preparation Date:** 05 October, 2005
3. **NEPA Number:** 05-esf-009b
4. **Case File Number:**
5. **Case File Location:** Wilderness files, Barstow NPS Office
6. **Findings:**
 - A. The proposed activity is consistent with existing statutes, regulations, policies and plans.
 - B. The proposed activity would involve prohibited uses listed in Section 4(c) of the Wilderness Act.
 - C. The proposed activity involving prohibited uses could not be reasonably accomplished outside of the wilderness area.
 - D. The proposed activity could not be reasonably accomplished without use of the actions prohibited by the Wilderness Act.
7. **Determinations:**
 1. There are no reasonable alternatives that do not involve any prohibited acts in Section 4(c) of the Wilderness Act.
 2. The selection of the preferred alternative was not guided solely by cost, convenience or efficiency but may have considered time and cost effectiveness.
 3. Impacts on the wilderness character and issues associated with the various alternatives are as follows:
 - a. Helicopter Transportation of sheep and personnel - temporary impacts to wilderness character; potential concern for human health and safety.
 - b. Horse Use and Walking -- temporary impacts on wilderness character. Would have rendered project infeasible because it is not possible to capture sheep on foot or on horseback. High human health and safety risk
 - c. No Action -- long-term impacts on wildlife (potential bighorn sheep expatriation).
8. **Decision:** Alternative a. Helicopter Transportation, is hereby selected.

Justification: A helicopter is needed to transport sheep and personnel over rough terrain. Alternative b, *horse use, hand tools, and walking*, is not feasible because people and horses cannot out maneuver sheep in the rough terrain. Furthermore it would increase the trauma to the captured sheep and may increase mortality. Alternative c, *No action*, is not selected due to uncertain environmental impacts and potential risks to sheep populations. It is hereby determined that alternative a, *Helicopter transportation* is selected to help protect the health of bighorn sheep. The health of the sheep herd is necessary to help maintain wilderness character. This alternative is therefore the minimum tool necessary for administration of this wilderness area.

9. Approval:



Mary G. Martin, Superintendent
array

10/27/05

Date